



ELECTRONIC AND AVIONICS SYSTEMS

INSTALLATION MANUAL

BENDIX/KING®

KTR 909/909A

UHF COMM TRANSCEIVER

KFS 599A

UHF COMM CONTROL UNIT

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SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the BENDIX/KING Gold Crown KTR 909 and KTR 909A Ultra High Frequency (UHF) Communications Transceiver and the KFS 599A Control Unit. Installation and operating procedures are also included.

1.2 EQUIPMENT DESCRIPTION

The KTR 909 and KTR 909A are UHF Transceivers that provide two way voice and data communications between 225.000 and 399.975 MHz in 25 kHz increments (7000 channels). Operation of the KTR 909 Transceiver is controlled by the KFS 599A Control Unit. Operation of the KTR 909A Transceiver is controlled by either a Radio Management System (through the ARINC 429 interface) or a KFS 599A Control Unit (as a backup).

The KTR 909/909A can be rigidly mounted in any position. An ADF Mode is available that disables the transmitter and enables an external ADF computer. The KFS 599A is the standard control unit and features channel and frequency selection and may be panel or console mounted. The operating frequency may be set manually or by selection of a pre-programmed channel. Optional flavor dependent features available for the KFS 599A are described in paragraph 1.4.2.

1.3 TECHNICAL CHARACTERISTICS

KTR 909/909A TRANSCEIVER	
ENVIRONMENTAL COMPLIANCE	Refer to Appendix E
PHYSICAL DIMENSIONS	
Width (KTR 909)	1.75 in (4.45 cm)
Width (KTR 909A)	2.40 in (6.09 cm)
Height (unit only)	5.00 in (12.70 cm)
Height (with mounting rack)	5.25 in (13.34 cm)
Length (including connector)	13.90 in (35.30 cm)
WEIGHT (unit only)	
KTR 909	3.50 lbs (1.59 kg)
KTR 909A	3.80 lbs (1.68 kg)
TEMPERATURE RANGE	-55°C to +55°C
MAXIMUM ALTITUDE	50,000 ft (unpressurized)
POWER REQUIREMENTS	
Receive (KTR 909)	27.5 VDC at 0.6 A typical
Receive (KTR 909A)	27.5 VDC at 0.7 A typical
Transmit (KTR 909/909A)	27.5 VDC at 8.0 A typical
FREQUENCY RANGE	225.000 to 399.975 MHz in 25 kHz increments
FREQUENCY SELECTION	Manual or by selecting either 1 of 20 programmable channels or a programmable guard channel

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KTR 909/909A TRANSMITTER

POWER OUTPUT	No less than 8 W (@ + 27.5 VDC input)
DUTY CYCLE	4:1 (4 min receive - 1 min transmit)
MODULATION CAPABILITY	No less than 80% and no more than 98%
AUDIO OUTPUT	No less than 100 mW into 500 Ω load
SIDETONE OUTPUT	Up to 100 mW into 500 Ω load (adjustable)
MICROPHONE INPUT	Carbon, or Dynamic with transistorized preamp; Must provide no less than 120 mVRMS into 100 Ω load
HARMONIC CONTENT	Greater than 55 dB down from carrier level
SPURIOUS OUTPUTS	No less than 60 dB below carrier level
X-MODE AUDIO INPUT	0.78 VRMS into 600 Ω load (0 dBm) per MIL-STD-188C

KTR 909/909A RECEIVER

SENSITIVITY	3 μ V for no less than 6 dB signal plus noise-to-noise with 1000 Hz tone modulated 30%
SELECTIVITY	
Narrow Band	6 dB bandwidth no less than 25.0 kHz with no less than 12.0 kHz on each side; 50 dB bandwidth no more than 50.0 kHz with no more than 27.0 kHz on each side
Wide Band	6 dB bandwidth no less than 70 kHz with no less than 33.0 kHz on each side; 60 dB bandwidth no more than 145 kHz with no more than 75 kHz on each side
STANDARD AUDIO OUTPUT	No less than 100 mW into 500 Ω load
STANDARD AUDIO RESPONSE	No more than 3 dB variation from 350 to 2500 Hz
WIDE BAND AUDIO OUTPUT	0.78 VRMS into 600 Ω load (0 dBm) per MIL-STD-188C
WIDE BAND AUDIO RESPONSE	No more than 6 dB variation from 70 to 25,000 Hz
AGC CHARACTERISTICS	Audio level variation not more than 3 dB with receiver input variation 10 μ V to 400 mV
SQUELCH	Standard audio output has automatic squelch (internally adjustable carrier to noise) with manual disable and squelch override; Wide band audio output is not squelched
SPURIOUS RESPONSES AND CROSS MODULATION PRODUCTS	At least 70 dB down
IMAGE RESPONSE	At least 60 dB down
THIRD ORDER INTERMODULATION DISTORTION	At least 60 dB down

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KFS 599A CONTROL UNIT

ENVIRONMENTAL COMPLIANCE	Refer to Appendix E
PHYSICAL DIMENSIONS	
Width	2.093 in (5.56 cm)
Height	2.250 in (5.97 cm)
Depth	5.500 in (13.97 cm)
WEIGHT	1.1 lbs (0.5 kg)
TEMPERATURE RANGE	-20°C to +55°C
FREQUENCY CONTROL RANGE	225.000 MHz to 399.975 MHz in 25 kHz increments
POWER REQUIREMENTS	+ 10 VDC at 450 mA typical -26 VDC at 6 mA typical + 185 VDC at 6.2 mA typical
	NOTE: All power supplied by KTR 909/909A
LIGHTING	5 VDC at 200 mA typical 28 VDC at 50 mA typical

1.4 UNITS AND ACCESSORIES SUPPLIED

1.4.1 KTR 909/909A UHF COMMUNICATIONS TRANSCEIVER

The KTR 909 and KTR 909A functional characteristics are equivalent with the exception that operation of the KTR 909 (P/N 064-01065-0100) is controlled by a KFS 599A Control Unit and operation of the KTR 909A (P/N 064-01066-01SS) is controlled by either a Radio Management System (through an ARINC 429 interface) or a KFS 599A Control Unit (as a backup). The SS indicates the software revision level.

1.4.2 KFS 599A CONTROL UNIT

The KFS 599A is the only source of control for the KTR 909 Transceiver. The KTR 909A uses either a Radio Management System (with an ARINC 429 interface) or a KFS 599A Control Unit (as a backup). In either case, the KFS 599A may be installed alone or in a tandem configuration. However, the KFS 599A will not operate simultaneously with the Radio Management System. The KFS 599A is available under P/N 071-01546-XXSS. The SS indicates the software revision level and the XX indicates the hardware flavor. The following table lists the flavor dependent hardware characteristics of the KFS 599A and the associated part number.

KFS 599A FLAVOR CHART

PART NUMBER	DISPLAY TYPE	BEZEL COLOR	BEZEL LTG	VOLUME CONTROL
071-01546-01SS	GAS	BLACK	28 VDC	YES
071-01546-12SS	GAS	BLACK	5 VDC	NO
071-01546-14SS	GAS	GRAY	5 VDC	NO

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1.4.3 KTR 909/909A INSTALLATION KIT

The KTR 909/909A Installation Kit (P/N 050-03146-0010) is available with the following components:

P/N	DESCRIPTION	UM	QTY	VENDOR PART NUMBER
030-01157-0011	CONTACT SOCKET	EA	41	POSITRONIC FC 6020D-14
200-05571-0000	MANIFOLD CONN ASSY	EA	1	
030-00134-0000	CONNECTOR TNC	EA	1	TED 5-10-30
030-01428-0005	HOOD/LEVER ASSY	EA	1	POSITRONIC D50000GVL-1023.0
071-04022-0001	RACK ASSY	EA	1	
150-00024-0000	SHRINK TUBING (1")	EA	2	

1.4.4 KFS 599A INSTALLATION KIT

The KFS 599A Installation Kit (P/N 050-02091-0001) is available with a crimp-type connector pin. Two kits will be required for tandem installations. Kit contents are as follows:

P/N	DESCRIPTION	UM	QTY	VENDOR PART NUMBER
030-01157-0011	SOCKET CRIMP 20G	EA	37	POSITRONIC FC 6020D-14
030-01171-0000	HSG CONN 9S	EA	1	POSITRONIC RD09F00000
030-01174-0000	HSG CONN 29S	EA	1	POSITRONIC RD29F00000
030-01188-0000	PIN POLRZTN FEMALE	EA	1	
030-01222-0000	HOOD/LEVER	EA	1	POSITRONIC KD29000JVL
030-02351-0000	CONNECTOR HOOD	EA	1	POSITRONIC MD9000JVL
092-00052-0002	NUT ANCHOR 6-32	EA	2	

1.5 ACCESSORIES AND ITEMS REQUIRED, BUT NOT SUPPLIED

- A. Microphone: Carbon, or Dynamic with transistorized preamp.
- B. Communications Antenna (50 Ω) suitable for UHF.
- C. Coaxial cable for connecting the KTR 909/909A to the antenna will be required. The type of cable used is dependent on the length of the installation. Refer to the table below.

LENGTH	TYPE	PART NUMBER	COMMENTS
1 to 18 ft	RG-142B/A	024-00002-0000	18 foot cable of this type results in 29% power loss.
18 to 30 ft	Times Microwave Systems (AA 3657)	024-00013-0000	30 foot cable of this type results in 29% power loss.

Note: Under NO circumstances is a cable length greater than 30 feet recommended.

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1.6 TOOLS REQUIRED, BUT NOT SUPPLIED

A crimping tool, a positioner and insertion/extraction tools are needed when using connectors with crimp style pins in KTR 909/909A, or KFS 599A installations. The recommended tools and their part numbers (P/N) are listed below. Equivalent tools may be used.

INSERTION/EXTRACTION TOOLS

For 030-01157-0011 signal pins (Positronic P/N FC 6020D-14):

Positronic P/N MIL M81969/1-02 (Refer to Figure 1-1)

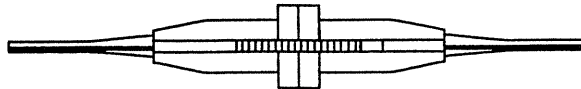


FIGURE 1-1 INSERTION/EXTRACTION TOOL
(Dwg No GP-AGAA433, R-0)

CRIMPING TOOLS

For 030-01157-0011 signal pins (Positronic P/N FC 6020D-14):

Crimper

Positronic P/N 9508 (Refer to Figure 1-2)

Positioner

Positronic P/N 9502-7 (Refer to Figure 1-2)

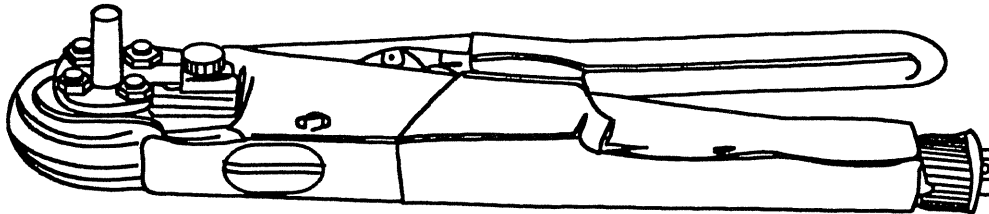


FIGURE 1-2 CRIMP TOOL WITH POSITIONER
(Dwg No GP-AGAA434, R-0)

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SECTION II
INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KTR 909/909A Transceiver and the KFS 599A Control Unit. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise caution when unpacking the equipment. Make a visual inspection of the equipment and look for evidence of damage that may have happened during shipment. If you need to make a claim for damage, save the shipping container to substantiate the claim. Your claim should be promptly filed with the transportation company. It is a good idea for you to retain the container and packaging material just in case you need to store or reship the equipment.

2.3 EQUIPMENT INSTALLATION

The KTR 909/909A and KFS 599A installations will conform to standards designated by the customer, the installing agency, and existing conditions as to the unit location and type of installation. However, the following suggestions should be considered before installing the KTR 909/909A or KFS 599A. If you follow these suggestions you will be assured of more satisfactory performance from the equipment.

2.3.1 COOLING CONSIDERATIONS

The greatest single contributor to increased reliability of all modern day avionics is to limit the maximum operating temperature of the individual units whether panel or remote mounted. While modern day circuit designs consume far less electrical energy, the watts per cubic inch dissipated still remains much the same due to high density packaging techniques. Consequently, the importance of providing avionics cooling is essential to the life span of the unit.

While each individual unit may or may not require forced air cooling, the combined heat load of several units operating in a typical avionics location will significantly degrade the reliability of the avionics if provisions for cooling are not incorporated in the initial installation. Failure to provide cooling will certainly lead to increased avionics maintenance costs and may void the BENDIX/KING warranty.

2.3.2 KTR 909/909A MECHANICAL INSTALLATION

- A. Select the KTR 909/909A location. The unit can be rigidly mounted. Allow at least one inch of free air space around the top and rear of the unit and one-half inch along each side. Allow adequate space for installation of cables and connectors.
- B. Refer to Figure 2-2 for the KTR 909 outline and mounting dimensions or to Figure 2-3 for the KTR 909A outline and mounting dimensions.
- C. Mark, punch, and drill the mounting holes. Care must be taken to avoid damage to adjacent equipment or cables.
- D. Secure the mounting rack firmly in place with installer provided hardware.
- E. Position the KTR 909/909A in the mounting rack and secure in place with the thumbscrew holding mechanism.

2.3.3 KTR 909/909A CABLE HARNESS AND CONNECTOR ASSEMBLY

Note: Wiring from aircraft power shall be 12 or 14 AWG (12 AWG preferable). All other wiring shall be 22 AWG minimum. All wiring shall comply with specifications MIL-W-5088, MIL-W-81409, MIL-C-27500, or equivalent. The +28 VDC AIRCRAFT POWER input shall be protected with a 10A circuit breaker or fuse.

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- A. The installing agency will supply and fabricate all external cables. The connectors and hardware required are supplied in the BENDIX/KING Installation Kit P/N 050-03146-0010. Figure 2-5 shows how to assemble the RF connector and wiring connector housing.
- B. The length and routing of the external cables must be carefully studied and planned before attempting actual installation. Maximum cable capacitance for Control Data, Control Clock, and Control Enable lines must not exceed 4000 pF per line. Avoid sharp bends and placing the wiring cables near aircraft control cables.
- C. Refer to Figure 2-4 and Figure 2-8 to become familiar with the KTR 909/909A connector pin locations for the fabrication of external cables.
- D. Fabricate and connect the external wiring to the KTR 909 or KTR 909A, and/or KFS 599A as necessary, using one of the appropriate interconnect drawings found in Figures 2-10 through 2-12. Refer to Figure 2-6 and be sure to ground cable shields to the ground lug when appropriate in the KTR 909/909A signal/power connector housing (P9091). Install shrink tubing on the power wires.
- E. If the KTR 909A receiver audio volume is to be controlled by an aircraft audio system, connect the AUDIO OUT HI and LO (P9091, pins 27 and 10) to the audio system input. Refer to Figure 2-11, details B through F.
- F. If the KTR 909A is energized from an external source, connect ON LINE=0 (P9091, pin 46) directly to the external on/off control signal. The KTR 909A is energized when this line is grounded.

2.3.4 KFS 599A MECHANICAL INSTALLATION

- A. Select the KFS 599A location. Ensure that the unit will be easily accessible and clearly visible to the pilot.
- B. For outline and mounting dimensions, refer to Figure 2-7 for the KFS 599A. Punch and drill the necessary mounting holes.
- C. Install the control unit with installer supplied hardware.

2.3.5 KFS 599A CABLE HARNESS AND CONNECTOR ASSEMBLY

- A. The installing agency will supply and fabricate the external cable. The connectors and hardware required are supplied in BENDIX/KING Installation Kit P/N 050-02091-0001 for the KFS 599A. Figure 2-9 shows how to assemble the wiring connector housing.
- B. The length and routing of the external cables must be carefully studied and planned before attempting actual installation. Maximum cable capacitance for Control Data, Control Clock, and Control Enable lines must not exceed 4000 pF per line. Avoid sharp bends and placing the wiring cables near aircraft control cables.
- C. Refer to Figure 2-8 to become familiar with the KFS 599A connector pin locations for fabrication of external cables.
- D. Connect the external wiring to the KFS 599A and associated equipment as necessary using the appropriate interconnect drawings found in Figures 2-10 through 2-12.

2.3.6 KFS 599A EXTERNAL CONTROL FUNCTIONS

The use of some of these pins affects the operation of the radio system. Refer to Section 3 for detailed radio system operating procedures. When the name of a control function ends with "=0," this means that the line is active when grounded or at a low potential.

2.3.6.1 Control Disable Select=0 (P5992, Pin 8)

The front panel controls are disabled when this pin is grounded as part of the installation.

2.3.6.2 Remote Channel Request=0 (P5992, Pin 4)

This line is normally connected to a push button switch that, when pressed, momentarily grounds this line. When the radio system is not operating with a preset/guard channel selected, momentarily grounding this line will put the radio system in the channel mode of operation. Once the radio system is in the channel mode, momentarily grounding this line will cause the next higher programmed channel to be selected for operation.

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2.3.6.3 Program Disable Select=0 (P5992, Pin 7)

To prevent accidental programming or deprogramming of channels, this pin can be grounded as part of the installation. Channels common to a fleet of aircraft can be programmed into each KFS 599A control unit at a bench prior to installation in the aircraft. Slave KFS 599A Control Units must have this pin grounded.

2.3.6.4 Master=0/Slave (P5992, Pin 3)

Grounding this pin on one control unit designates that control unit as the master unit in a tandem installation. An open pin designates the slave unit. When a unit is designated as the slave unit, the PROGRAM DISABLE SELECT line (P5992, pin 7) must also be grounded. In tandem installations, one of the units must be designated as a master and the other must be designated as a slave.

2.3.6.5 Dimmer Override (P5991, Pin 13)

Grounding this pin disables the automatic display dimming. Display brightness will stay at maximum intensity.

2.3.6.6 Remote Display Mode=0 (P5991, Pin 2)

Momentarily grounding this pin will allow the control unit to change between manual and preset channel frequency selection.

2.3.6.7 Mic Key In=0 (P5991, Pin 21)

This is the transmitter keying or PTT line from the mic or communications system. When this pin is grounded, and the KTR 909/909A is installed with a KFS 599A control unit, the control unit delays the keying of the KTR 909 transmitter for about 5 ms on the Mic Key Out line (P5991, Pin 15) so there is time for the synthesizer to change as needed for transmitting.

2.3.6.8 ADF Enable=0 (P5992, Pin 6)

When this pin is grounded as part of the installation, access to the ADF receive mode is enabled.

2.3.6.9 On Line=0 (P5991, Pin 28)

This output is connected to the ON LINE=0 input to the KTR 909/909A (P9091, pin 46). When the ON/OFF/VOL/TEST knob on the KFS 599A is rotated clockwise out of the OFF detent position, this line goes low which energizes the KTR 909/909A, which in turn supplies the operating voltages for the KFS 599A.

2.3.6.10 Semi-duplex Inhibit=0 (P5992, Pin 5)

When this pin is grounded as part of the installation, use of channels with semi-duplex capabilities is inhibited.

2.3.6.11 Panel Lighting (P5991, Pins 17, 18 and 19)

Depending on the flavor of the control unit, the lighting voltage for the front panel bezel is either 28 volts or 5 volts. For installations using 28 volt lighting, P5991, pin 17 is connected to the aircraft lighting dimmer bus and P5991, pin 19 is connected to lighting low or ground. For installations using 5 volt lighting, P5991, pin 18 is connected to the aircraft lighting dimmer bus and P5991, pin 19 is connected to lighting low or ground.

2.3.6.12 Remote Guard Select=0 (P5992, Pin 9)

Momentarily grounding this pin will select the guard channel. A second momentary grounding will return the unit to the previous channel.

2.4 POST INSTALLATION CHECK

The procedures listed in the following paragraphs to check the radio system after the installation is complete. If a KFS 599A control unit is not part of the installation, skip paragraph 2.4.2. For all installations, perform the procedures listed in paragraphs 2.4.1, 2.4.3 and 2.4.4. Refer to Section 3 for detailed operating procedures.

2.4.1 INTERCOM COMPATIBILITY CHECK

Three adjustable potentiometers are located on the outside of the KTR 909/909A. Each one is preset at the factory to meet the specifications described in Section 1.3. Incorrectly adjusting these potentiometers to compensate for intercom system deficiencies can cause interference from overmodulation, splatter, and distortion.

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2.4.2 VERIFICATION TEST FOR INSTALLATIONS USING KFS 599A

The following steps verify the radio system installation. It is assumed that aircraft power is applied to the radio system. Refer to Section 3 for detailed operating procedures.

- A. Verify that when the ON/OFF/VOL/TEST knob is rotated fully counter-clockwise to the OFF detent position, the radio system is not energized. Verify that turning the ON/OFF/VOL/TEST knob clockwise out of the OFF detent position (on either unit in a tandem installation) causes the control unit display(s) to light, and, on units with volume control, verify that the volume control changes the audio level(s).
- B. Verify that pressing the ON/OFF/VOL/TEST knob will toggle the radio between squelched and unsquelched states.
- C. Vary the ambient light on the display by placing your finger over the photocell and verify that the display intensity decreases. Vary the lighting bus and verify that bezel backlighting reacts properly. In installations where automatic display dimming has been overridden (see paragraph 2.3.6.5), verify the display stays a maximum intensity when you place your finger over the photocell.
- D. If a control unit in your installation has controls disabled (see paragraph 2.3.6.1), verify that the controls do not function.
- E. If your installation is configured for remote channel control (see paragraph 2.3.6.2), verify that remote channel incrementing operates properly. More than one channel will have to be programmed to check this function.
- F. If your installation has channel programming disabled (see paragraph 2.3.6.3), verify channel programming mode can not be entered.
- G. If your installation has semi-duplex channel operation disabled (see paragraph 2.3.6.10), perform the following steps. Program one channel with different receive and transmit frequencies (refer to paragraph 3.3.4). With this channel active, verify that the receive and transmit frequencies are identical. Reprogram the selected channel to the original frequency.
- H. If your installation is configured to control the display remotely (see paragraph 2.3.6.6), verify selected frequency can be toggled remotely between the manual and preset channel frequency.
- I. If the current installation is configured for remote guard channel selection (see paragraph 2.3.6.12), verify that switch selects the guard channel.

2.4.3 RADIO SYSTEM INSTALLATION VERIFICATION TEST

If the KTR 909/909A is controlled by one or tandem KFS 599A Control Units, or if the KTR 909A is controlled by a Radio Management System (RMS), perform the following procedures using each control source.

- A. Toggle between channel and manual frequency selection mode.
- B. Verify that a channel and a manual frequency can be selected.
- C. Verify that MAIN and BOTH receive modes can be selected. If your installation is configured to use the ADF receive mode, verify this mode can be selected.
- D. Verify the GUARD channel can be selected and operates properly.
- E. Verify that an operating channel can be selected for programming if programming is not disabled (see paragraph 2.3.6.3).

CAUTION

AS AN ADDED PRECAUTION BEFORE TRANSMITTING, ANTENNA VSWR SHOULD BE CHECKED WITH AN IN-LINE TYPE WATTMETER INSERTED IN THE COAXIAL TRANSMISSION LINE BETWEEN THE TRANSCEIVER AND THE ANTENNA. ANY PROBLEM WITH THE ANTENNA INSTALLATION WILL MOST LIKELY BE SEEN AS HIGH REFLECTED POWER. A VSWR OF 3:1 WILL RESULT IN A 25% LOSS IN POWER.

- F. Perform a 1 kHz transmitter test and verify the transmitter is activated and modulated by a 1 kHz tone.
- G. If the installation is configured for X-Mode operation, place the radio system into the X-Mode and verify transmit and receive operations.

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2.4.4 FLIGHT TEST

A flight test is recommended to ensure satisfactory performance of the equipment in its normal environment after the installation is complete and the applicable post installation checks above have been made. Check all aircraft control movements to be sure there is no interference between wiring cables and aircraft control mechanisms. To check the communications transceiver, maintain an appropriate altitude and communicate with a ground station facility at a range of at least fifty nautical miles. Next, communicate with a ground station at a range of 5 nautical miles or less. Refer to Figure 2-1 to determine the maximum distance versus Above Ground Level (AGL) altitude for line-of-sight communication. Press the ON/OFF/VOL/TEST knob to defeat the automatic squelch and listen for any unusual electrical noise which would reduce receiver sensitivity. If possible, using authorized frequencies, verify the communications capability on both the high and low end of the UHF communications band. Press the ON/OFF/VOL/TEST knob again to enable the automatic squelch feature.

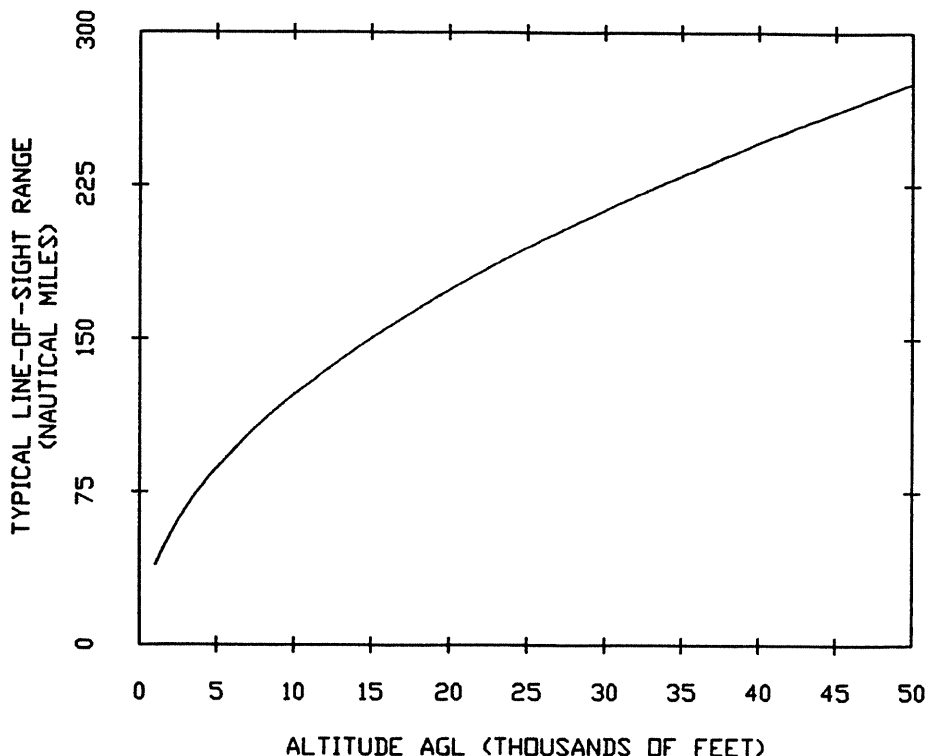
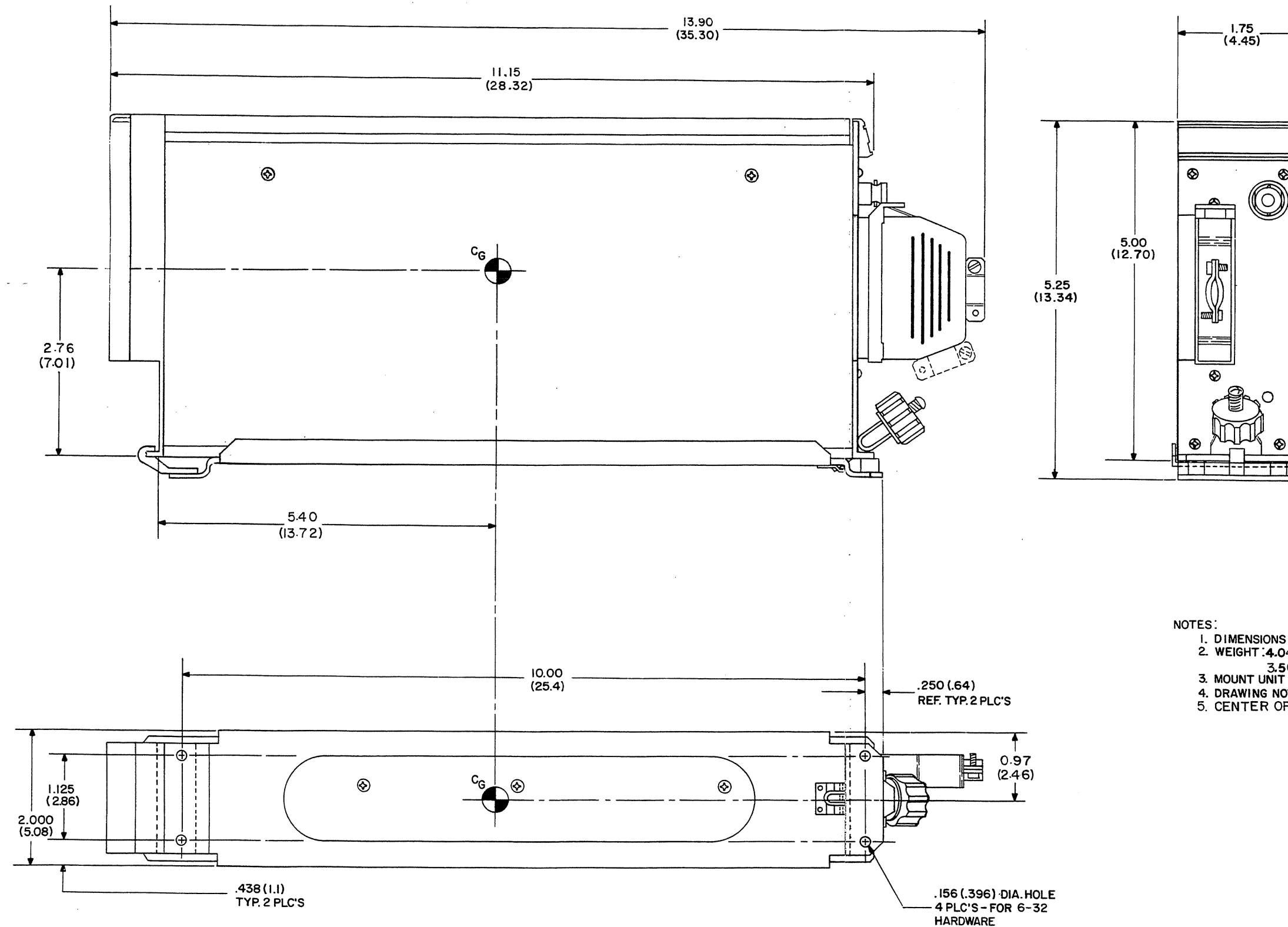


FIGURE 2-1 UHF LINE-OF-SIGHT DISTANCE VERSUS AGL ALTITUDE
(Dwg No GP-AGAA432, R-0)

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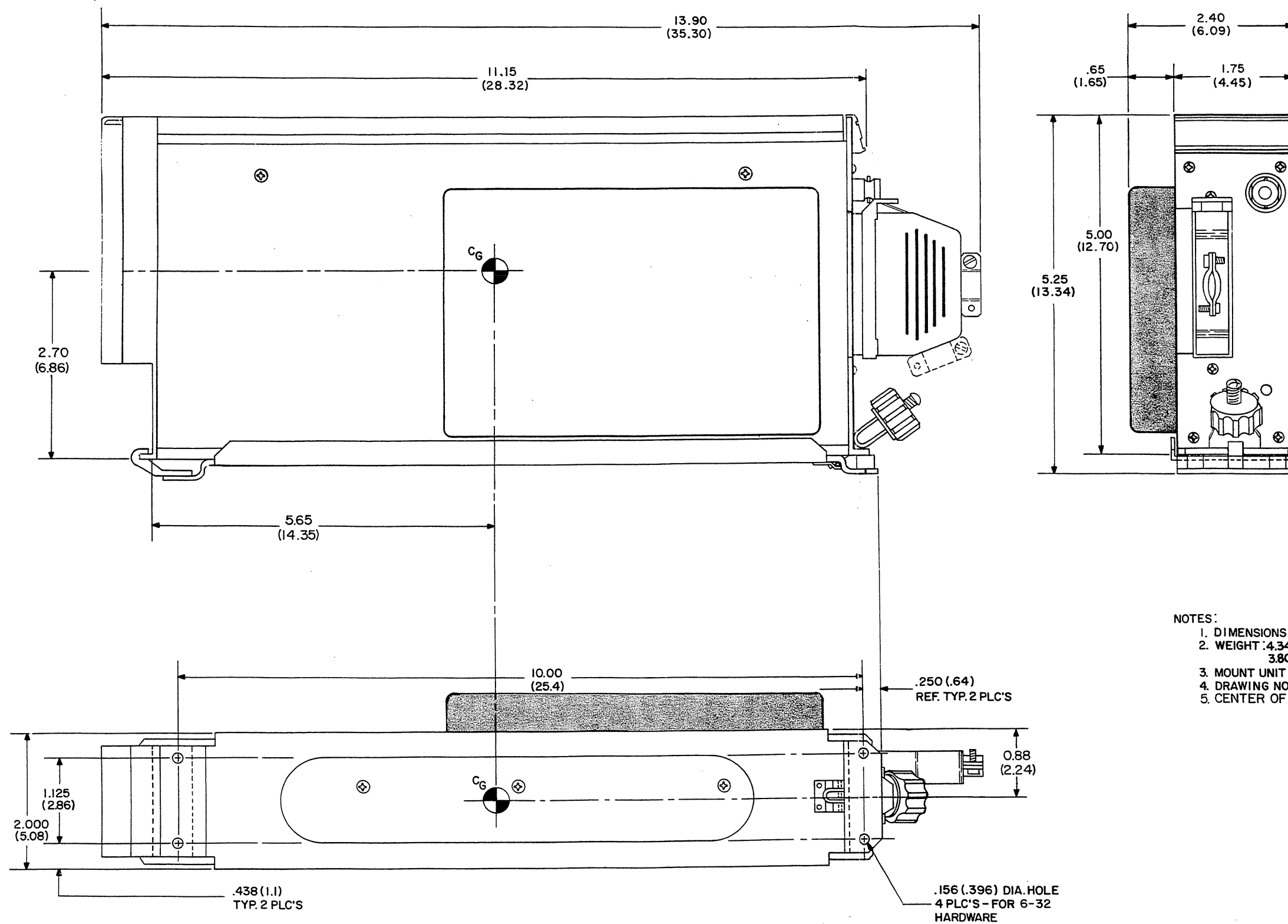
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- NOTES:
1. DIMENSIONS IN PARENTHESES ARE IN CENTIMETERS.
 2. WEIGHT :4.04 LBS (1.84 KG) MOUNTING AND CONNECTORS.
3.50 LBS (1.59 KG) UNIT ONLY.
 3. MOUNT UNIT RIGID IN ANY POSITIONS.
 4. DRAWING NOT TO SCALE.
 5. CENTER OF GRAVITY WITH CONNECTORS.

FIGURE 2-2 KTR 909 OUTLINE AND MOUNTING DIAGRAM
(Dwg No 155-05832-0000, R-1)

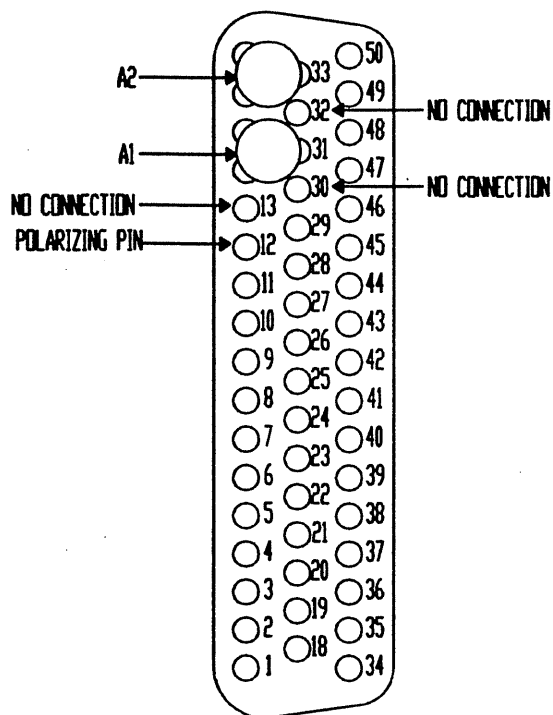
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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER



- NOTES:
1. DIMENSIONS IN PARENTHESES ARE IN CENTIMETERS.
 2. WEIGHT :4.34 LBS(1.92 KG) MOUNTING AND CONNECTORS.
3.80 LBS(1.68 KG) UNIT ONLY (APPROX).
 3. MOUNT UNIT RIGID IN ANY POSITIONS.
 4. DRAWING NOT TO SCALE.
 5. CENTER OF GRAVITY WITH CONNECTORS.

FIGURE 2-3 KTR 909A OUTLINE AND MOUNTING DIAGRAM
(Dwg No 155-05832-0001, R-1)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER



P9091
VIEWED FROM WIRING SIDE

PIN	FUNCTION
1	429-1 IN B
2	429-1 IN A
3	429-1 SIGNAL REFERENCE
4	ATE SQUELCH TEST
5	IF AGC
6	MIC AUDIO IN
7	X-MODE TRANSMIT AUDIO IN LOW
8	WIDE BAND AUDIO OUT HIGH
9	REMOTE VOLUME CONTROL
10	AUDIO OUT LOW
11	CONTROL ENABLE
12	POLARIZING KEY
13	NO CONNECTION
14	A1 - A/C POWER
15	A1 - A/C POWER
16	A2 - A/C GROUND
17	A2 - A/C GROUND
18	429 OUT A
19	429 OUT B
20	429 OUT SIGNAL REFERENCE
21	SQUELCH TEST LATCH = 0
22	SIGNAL PRESENT
23	X-MODE ENABLE = 0
24	ADF TRANSMITTER INTERLOCK = 0
25	WIDE BAND AUDIO OUT LOW
26	+ 185 VDC
27	AUDIO OUT HIGH
28	1kHz TONE = 0
29	OUT-OF-LOCK
30	NO CONNECTION
31	A1 - A/C POWER
32	NO CONNECTION
33	A2 - A/C GROUND
34	429-2 IN B
35	MIC AUDIO REFERENCE
36	429-2 IN A
37	N/C
38	RF AGC
39	WIDE BAND = 0/NARROW BAND CONTROL
40	MIC KEY IN = 0
41	X-MODE TRANSMIT AUDIO IN HIGH
42	CONTROL CLOCK
43	-26 VDC
44	CONTROL DATA
45	+ 10 VDC
46	ON LINE = 0
47	429-2 SIGNAL REFERENCE
48	SIGNAL REFERENCE
49	SIGNAL REFERENCE
50	SIGNAL REFERENCE
A1	A/C POWER
A2	A/C GROUND

FIGURE 2-4 KTR 909/909A P9091 PIN LOCATION DIAGRAM AND PIN FUNCTION LIST
(Dwg No GP-AGAA430, R-0)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER

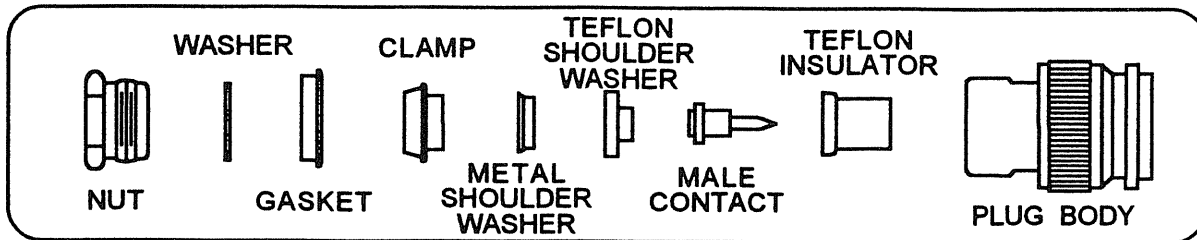


Diagram showing the nut and gasket being placed over the cable jacket. A dimension line indicates a length of $5/16$.	Place nut and gasket with "V" groove toward clamp, over cable and cut jacket to dimension shown.
Diagram showing the braid being cut and folded out. A dimension line indicates a length of $3/16$.	Comb out braid and fold out. Cut cable dielectric to dimension shown. Tin center conductor, using minimum amount of heat.
Diagram showing the braid wires being pulled forward and tapered toward the center conductor. A clamp is shown being placed over the braid.	Pull braid wires forward and taper toward center conductor. Place clamp over braid and push back against jacket.
Diagram showing the male contact being soldered to the center conductor. A dimension line indicates a length of $1/8$.	Fold back braid wires as shown, trim to proper length and form over clamp as shown. Slip metal shoulder washer and teflon shoulder washer over center conductor and teflon insulator. Solder contact to center conductor, avoiding excessive heat which may swell cable dielectric. Slip teflon insulator over contact.
Diagram showing the completed cable termination inserted into the connector body.	Insert prepared cable termination into connector body. Make sure sharp edge at clamp seats properly in gasket. Tighten nut.

FIGURE 2-5 KTR 909/909A RF CONNECTOR ASSEMBLY
(Dwg No GP-AGAA429, R-0)

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UHF COMMUNICATIONS TRANSCEIVER

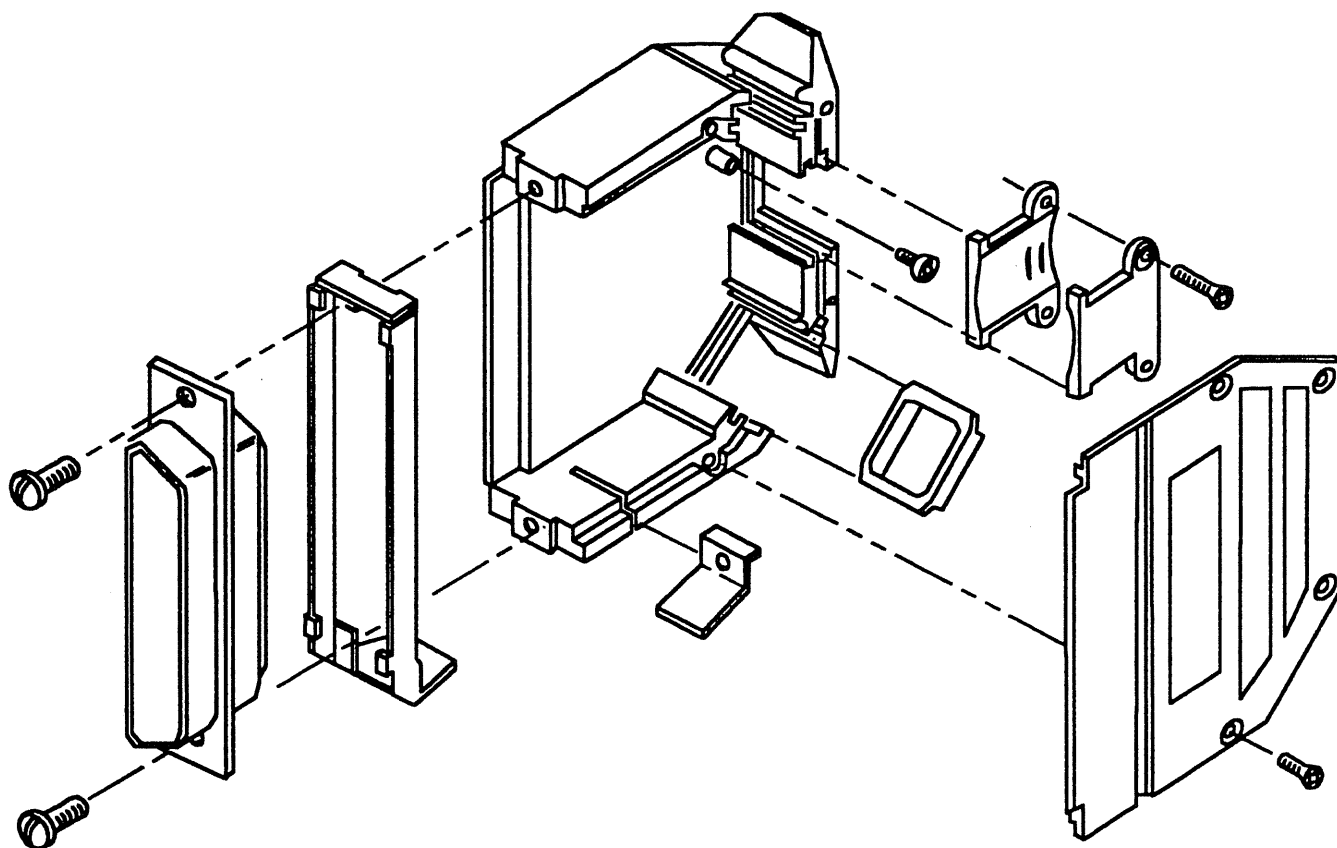
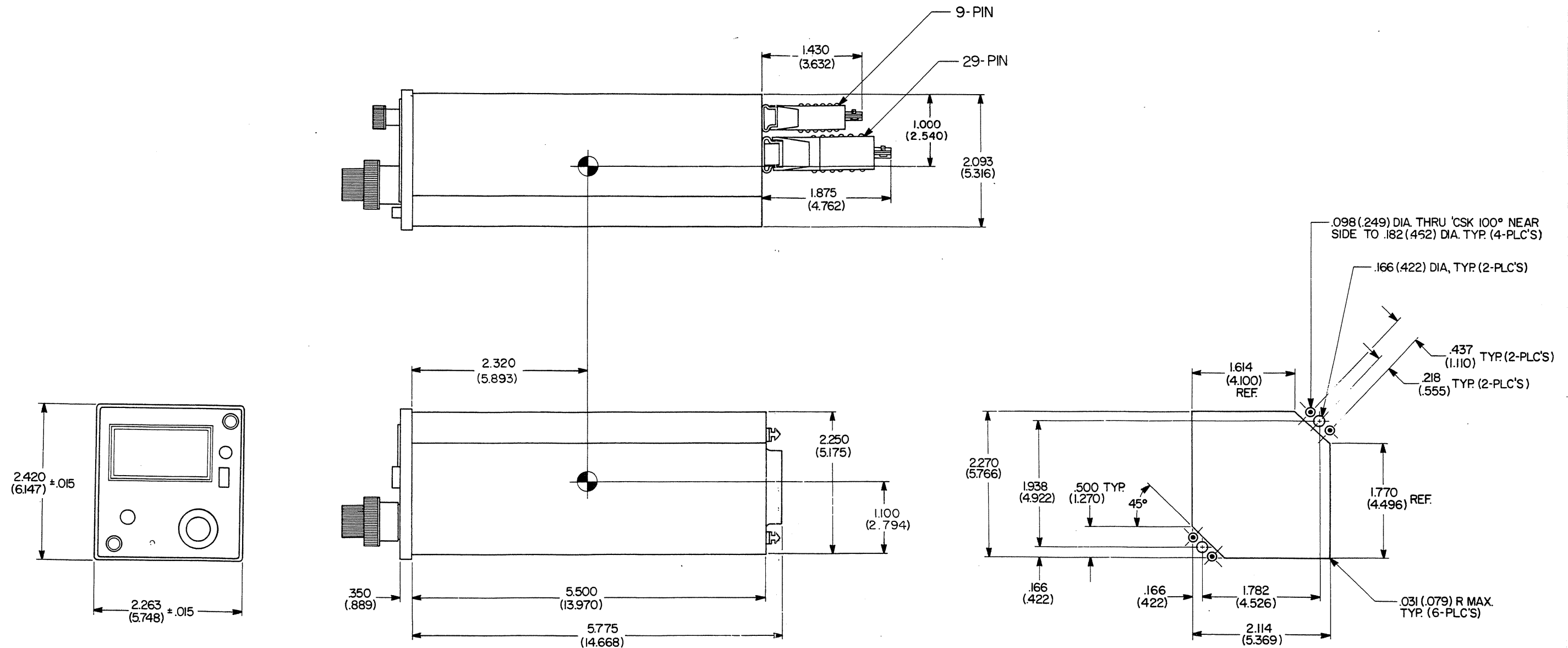


FIGURE 2-6 KTR 909/909A SIGNAL/POWER CONNECTOR ASSEMBLY
(Dwg No GP-AGAA363, R-0)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER

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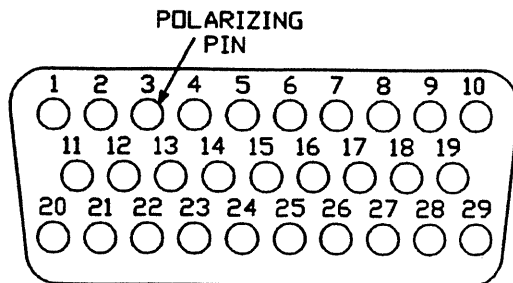


NOTES:

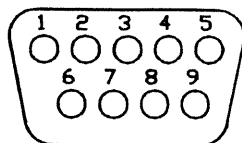
- 1.) MOUNTING PATTERN FOR CONTROL HEADS WITH ANCHOR-NUTS.
(KING PART NO. 092-00052-0002)
- 2.) SEE INSTALLATION KIT FOR KING PART NUMBER OF CONNECTOR.
- 3.) DIMENSIONS IN PARENTHESIS ARE IN CENTIMETERS.
- 4.) PUNCH NO.: 071-06042-0015
- 5.) DECAL NO.: 057-02105-0015
- 6.) FILE TEMPLATE NO.: 071-06039-0015
- 7.) WEIGHT: 1.1 LBS / 0.5 KG.

FIGURE 2-7 KFS 599A OUTLINE AND MOUNTING DIAGRAM
(Dwg No 155-05829-0000, R-0)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER



<u>PIN</u>	<u>FUNCTION</u>
1	N/C
2	REMOTE DISPLAY MODE
3	POLARIZING PIN
4	SYNTHESIZER CONTROL CLOCK
5	SYNTHESIZER CONTROL DATA
6	SYNTHESIZER CONTROL ENABLE
7	-26 VDC
8	+10 VDC
9	+10 VDC
10	+185 VDC
11	AUDIO IN HIGH
12	1 kHz TONE=0
13	DIMMER OVERRIDE
14	ADF TRANSMIT INTERLOCK=0
15	MIC KEY OUT=0
16	AUDIO OUT HIGH
17	+28 VDC LIGHTING
18	+5 VDC LIGHTING
19	PANEL LIGHT GROUND
20	AUDIO IN LOW
21	MIC KEY IN=0
22	AUDIO OUT LOW
23	SIGNAL PRESENT
24	OUT-OF-LOCK
25	SQUELCH TEST LATCH=0
26	SIGNAL REFERENCE
27	SIGNAL REFERENCE
28	ON LINE=0
29	REMOTE VOLUME CONTROL



<u>PIN</u>	<u>FUNCTION</u>
1	SERIAL BUS A
2	SERIAL BUS B
3	MASTER=0/S�AVE SELECT
4	REMOTE CHANNEL REQUEST = 0
5	SEMIDUPLEX INHIBIT = 0
6	ADF ENABLE = 0
7	PROGRAM DISABLE SELECT = 0
8	CONTROL DISABLE SELECT = 0
9	GUARD SELECT = 0

FIGURE 2-8 KFS 599A P5991/P5992 PIN LOCATION DIAGRAMS AND PIN FUNCTION LISTS
(Dwg No GP-AGAA431, R-0)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER

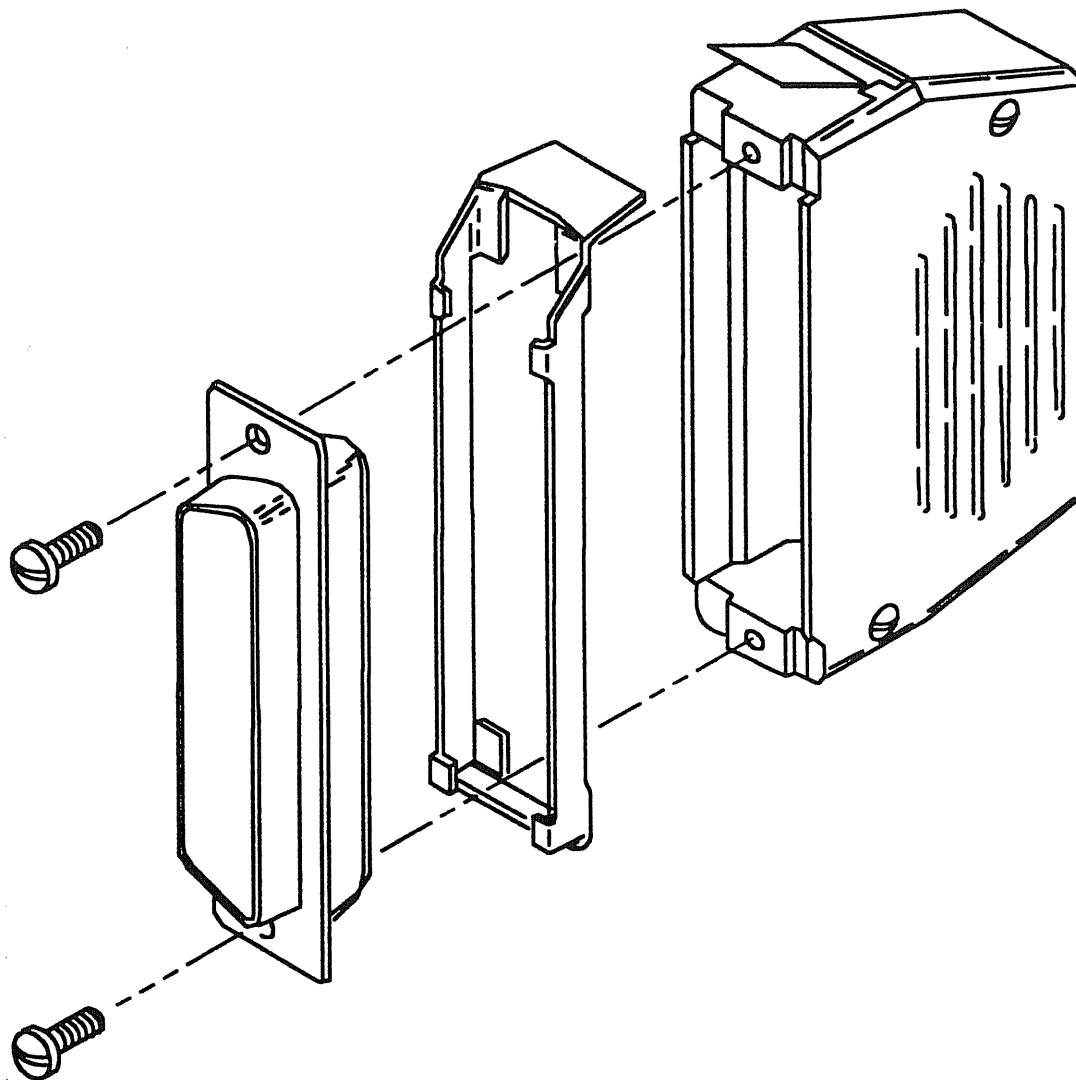
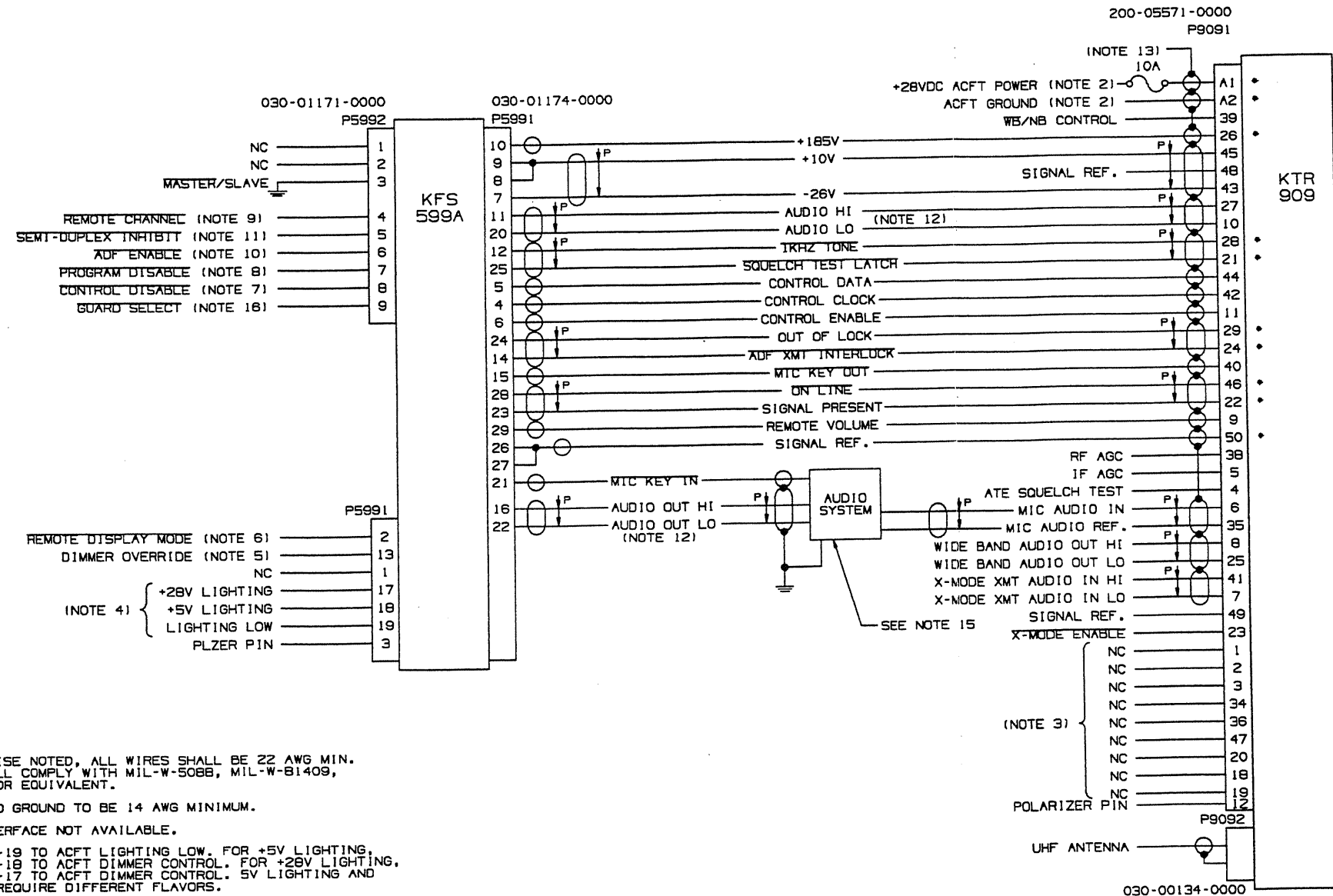


FIGURE 2-9 KFS 599A CONNECTOR ASSEMBLY
(Dwg No GP-AGAA401, R-0)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER

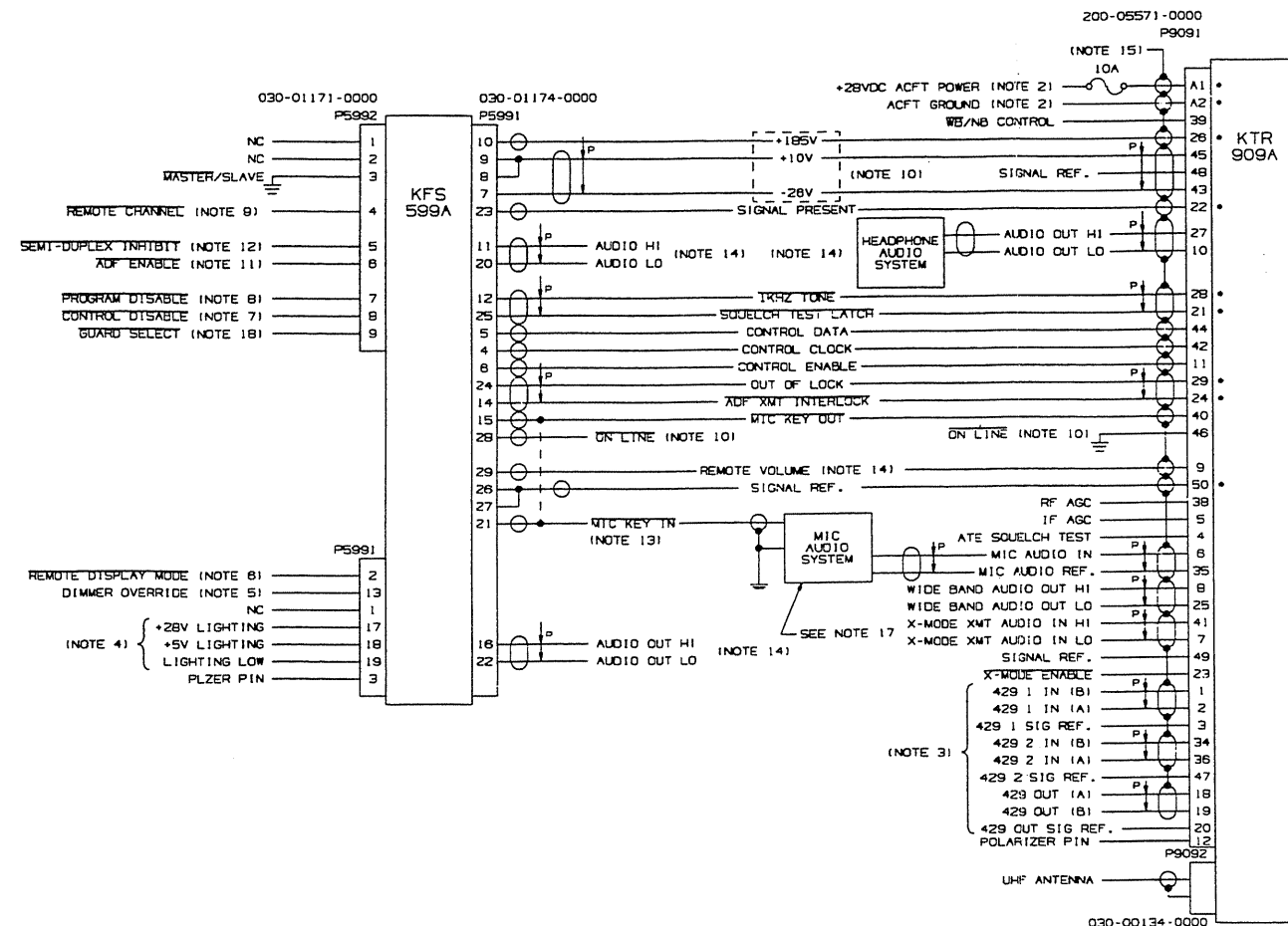


NOTES:

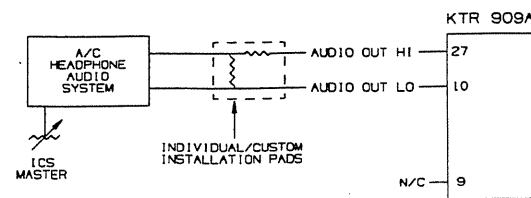
1. UNLESS OTHERWISE NOTED, ALL WIRES SHALL BE 22 AWG MIN.
ALL WIRES SHALL COMPLY WITH MIL-W-5088, MIL-W-81409,
MIL-C-27500, OR EQUIVALENT.
2. ACFT POWER AND GROUND TO BE 14 AWG MINIMUM.
3. ARINC-429 INTERFACE NOT AVAILABLE.
4. CONNECT P5991-19 TO ACFT LIGHTING LOW. FOR +5V LIGHTING,
CONNECT P5991-18 TO ACFT DIMMER CONTROL. FOR +28V LIGHTING,
CONNECT P5991-17 TO ACFT DIMMER CONTROL. 5V LIGHTING AND
28V LIGHTING REQUIRE DIFFERENT FLAVORS.
5. CONNECT TO "SIGNAL REF." TO DISABLE AUTO DIMMING.
6. NORMALLY OPEN CONTACT SWITCH IS MOMENTARILY SHORTED TO
"SIGNAL REF." TO CHANGE BETWEEN PRESET AND MANUAL FREQUENCY SELECTION.
7. CONNECT TO "SIGNAL REF." TO DISABLE FRONT PANEL SWITCH FUNCTIONS.
8. CONNECT TO "SIGNAL REF." TO DISABLE PRESET CHANNEL PROGRAMMING.
9. NORMALLY OPEN CONTACT SWITCH IS MOMENTARILY SHORTED TO
"SIGNAL REF." TO INCREMENT PRESET CHANNEL NUMBER BY ONE.
10. CONNECT TO "SIGNAL REF." TO ALLOW USE OF EXTERNAL ADF COMPUTER.
11. CONNECT TO "SIGNAL REF." TO INHIBIT THE USE OF SEMI-DUPLEX
TRANSMIT FREQUENCIES.
12. THE KFS 599A HAS A 500 OHM L-PAD BETWEEN J5991-11 AND 20 AND
BETWEEN J5991-16 AND 22 CONNECTED IN THIS CONFIGURATION.
13. TO P9091 BACKSHELL GROUNDING TERMINAL.
14. FOR COMPOSITE AIRCRAFT INSTALLATIONS OR INSTALLATIONS THAT ARE SUSCEPTIBLE
TO DIRECT OR CONDUCTED RADIATION FROM EITHER TRANSMITTER ANTENNAS OR
CROSSTALK FROM PARALLEL INTERCONNECTIONS, ALL THE WIRES IN THE UHF HARNESS
SHOULD BE SHIELDED. FOR INSTALLATIONS ON METAL SKINNED AIRCRAFT THE WIRES
INDICATED BY AN ASTERISK (*) MAY NOT NEED SHIELDING.
15. OPTIMUM INSTALLATION OF AUDIO SYSTEM REQUIRES "MIC AUDIO IN" AND "MIC AUDIO REF."
BE AN UNGROUNDED TRANSFORMER OUTPUT SUPPLIED TO THE KTR 909. "MIC AUDIO REF."
IS AN INTERNAL GROUND INSIDE THE KTR 909.
16. NORMALLY OPEN CONTACT SWITCH IS MOMENTARILY SHORTED TO "SIGNAL REF." TO
CHANGE BETWEEN GUARD AND PREVIOUS CHANNEL.

FIGURE 2-10 KTR 909 AND KFS 599A INTERCONNECTION DIAGRAM
(Dwg No 155-01632-0000, R-3)

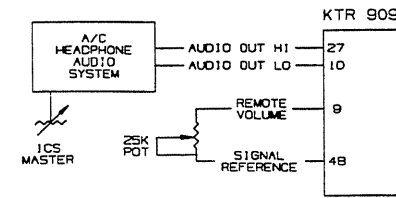
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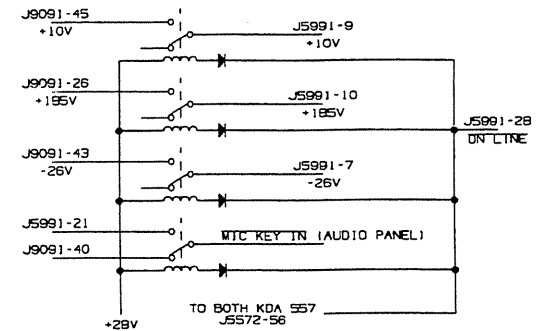
- NOTES:
1. UNLESS OTHERWISE NOTED, ALL WIRES SHALL BE 22 AWG MIN. ALL WIRES SHALL COMPLY WITH MIL-W-5088, MIL-W-81409, MIL-C-27500, OR EQUIVALENT.
 2. ACFT POWER AND GROUND TO BE 14 AWG MINIMUM.
 3. ALL 429 LINES SHALL COMPLY WITH THE RECOMMENDATIONS OF ARINC 429-12.
 4. CONNECT P5991-19 TO ACFT LIGHTING LOW. FOR +5V LIGHTING, CONNECT P5991-18 TO ACFT DIMMER CONTROL. FOR +26V LIGHTING, CONNECT P5991-17 TO ACFT DIMMER CONTROL. 5V LIGHTING AND 26V LIGHTING REQUIRE DIFFERENT FLAVORS.
 5. CONNECT TO "SIGNAL REF." TO DISABLE AUTO DIMMING.
 6. NORMALLY OPEN CONTACT SWITCH IS MOMENTARILY SHORTED TO "SIGNAL REF." CHANGE BETWEEN PRESET AND MANUAL FREQUENCY SELECTION.
 7. CONNECT TO "SIGNAL REF." TO DISABLE FRONT PANEL SWITCH FUNCTIONS.
 8. CONNECT TO "SIGNAL REF." TO DISABLE PRESET CHANNEL PROGRAMMING.
 9. NORMALLY OPEN CONTACT SWITCH IS MOMENTARILY SHORTED TO "SIGNAL REF." TO INCREMENT PRESET CHANNEL NUMBER BY ONE.
 10. FOR RMS-555 OPERATION WITH A KFS 599A BACKUP CONTROLLER, J9091-46 IS CONNECTED TO ACFT GROUND AND J5991-28 IS TIED TO THE COIL OF THREE RELAYS AND J5572-56 OF BOTH KDA 557 UNITS AS SHOWN IN DETAIL A.
 11. CONNECT TO "SIGNAL REF." TO ALLOW USE OF EXTERNAL ADF COMPUTER.
 12. CONNECT TO "SIGNAL REF." TO INHIBIT THE USE OF SEMI-DUPLEX TRANSMIT FREQUENCIES.
 13. FOR RMS-555 OPERATION WITH KFS 599A BACKUP CONTROLLER, THE MIC KEY INPUT IS CONNECTED AS IN DETAIL A.
 14. SELECT THE APPROPRIATE VOLUME CONTROL OPTION AS SHOWN IN DETAILS B THROUGH F.
 15. TO P9091 BACKSHELL GROUNDING TERMINAL.
 16. FOR COMPOSITE AIRCRAFT INSTALLATIONS OR INSTALLATIONS THAT ARE SUSCEPTIBLE TO DIRECT OR CONDUCTED RADIATION FROM EITHER TRANSMITTER ANTENNAS OR CROSSTALK FROM PARALLEL INTERCONNECTIONS, ALL THE WIRES IN THE UHF HARNESS SHOULD BE SHIELDED. FOR INSTALLATIONS ON METAL SKINNED AIRCRAFT THE WIRES INDICATED BY AN ASTERISK (*) MAY NOT NEED SHIELDING.
 17. OPTIMUM INSTALLATION OF AUDIO SYSTEM REQUIRES "MIC AUDIO IN" AND "MIC AUDIO REF." BE AN UNGROUNDED TRANSFORMER OUTPUT SUPPLIED TO THE KTR 909A. "MIC AUDIO REF." IS AN INTERNAL GROUND INSIDE THE KTR 909A.
 18. NORMALLY OPEN CONTACT SWITCH IS MOMENTARILY SHORTED TO "SIGNAL REF." TO CHANGE BETWEEN GUARD AND PREVIOUS CHANNELS.



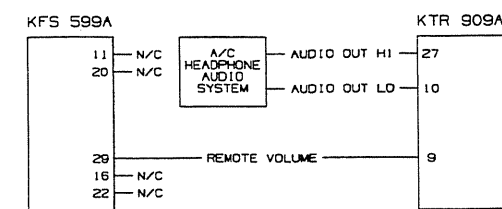
**FIXED
VOLUME CONTROL
DETAIL F**



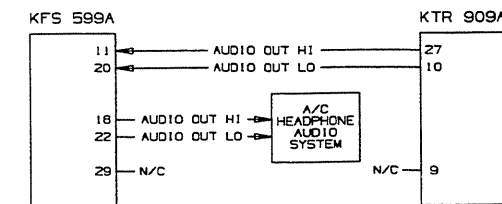
**REMOTE
VOLUME CONTROL OPTION 2
DETAIL E**



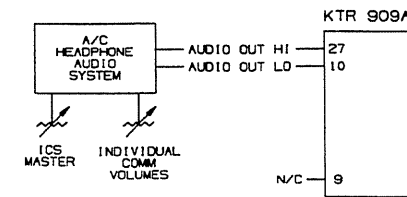
DETAIL A



**KFS 599A
VOLUME CONTROL OPTION 1
DETAIL B**



**KFS 599A
VOLUME CONTROL OPTION 2
DETAIL C**



**REMOTE
VOLUME CONTROL OPTION 1
DETAIL D**

FIGURE 2-11 KTR 909A AND KFS 599A AND ARINC 429 INTERCONNECTION DIAGRAM
(Dwg No 155-01633-0000, R-3)

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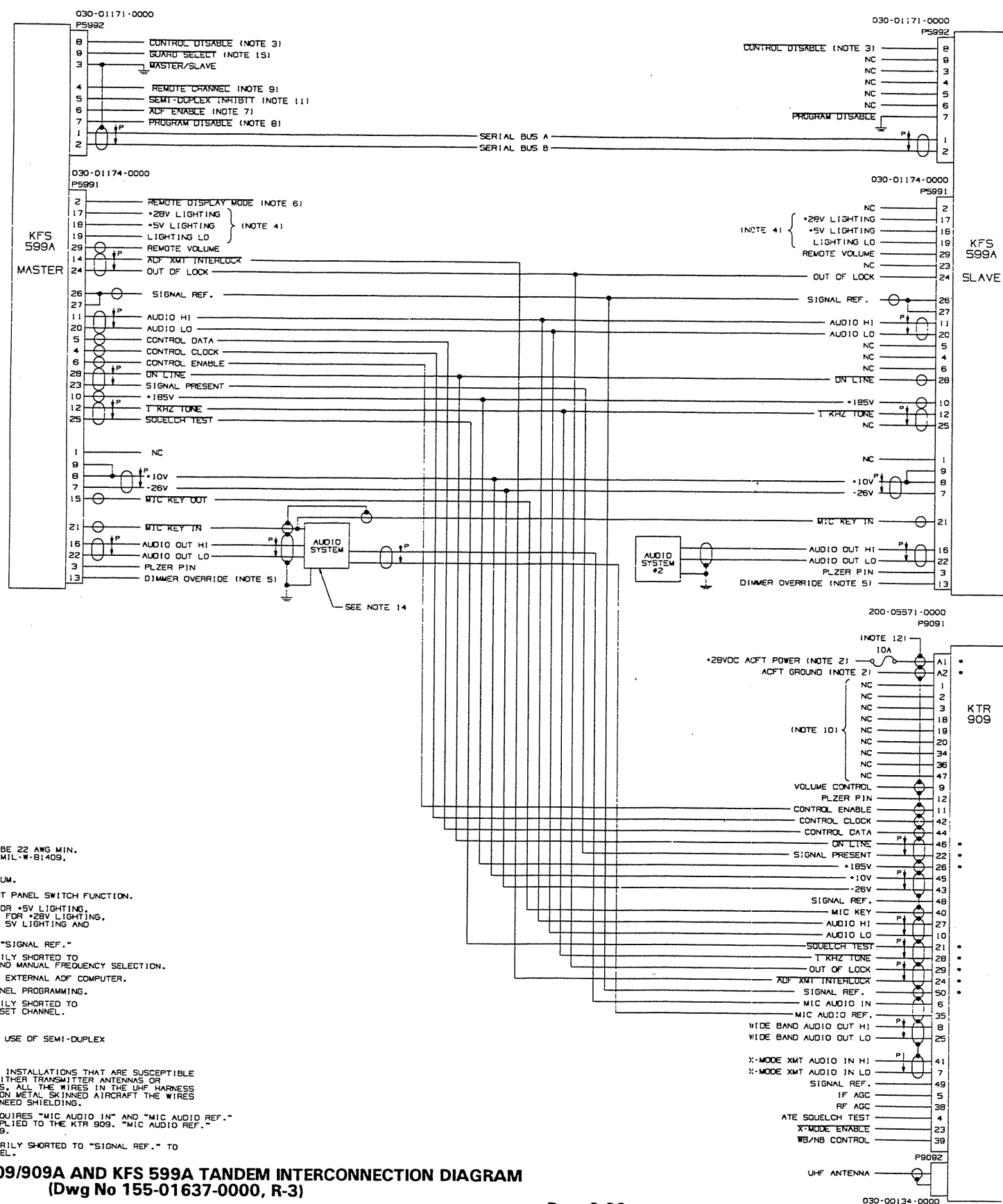


FIGURE 2-12 KTR 909/909A AND KFS 599A TANDEM INTERCONNECTION DIAGRAM
(Dwg No 155-01637-0000, R-3)

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KTR 909/909A KFS 599A
UHF COMMUNICATIONS TRANSCEIVER

SECTION III

OPERATION

3.1 SYSTEM DESCRIPTION

3.1.1 KTR 909 UHF TRANSCEIVER

The KTR 909 UHF Transceiver is a light-weight UHF communications radio capable of receiving or transmitting voice or data within the frequency range of 225.000 MHz to 399.975 MHz in 25 kHz steps. Tuning information is supplied by the KFS 599A Control Unit. Refer to Figure 3-1 for a block diagram.

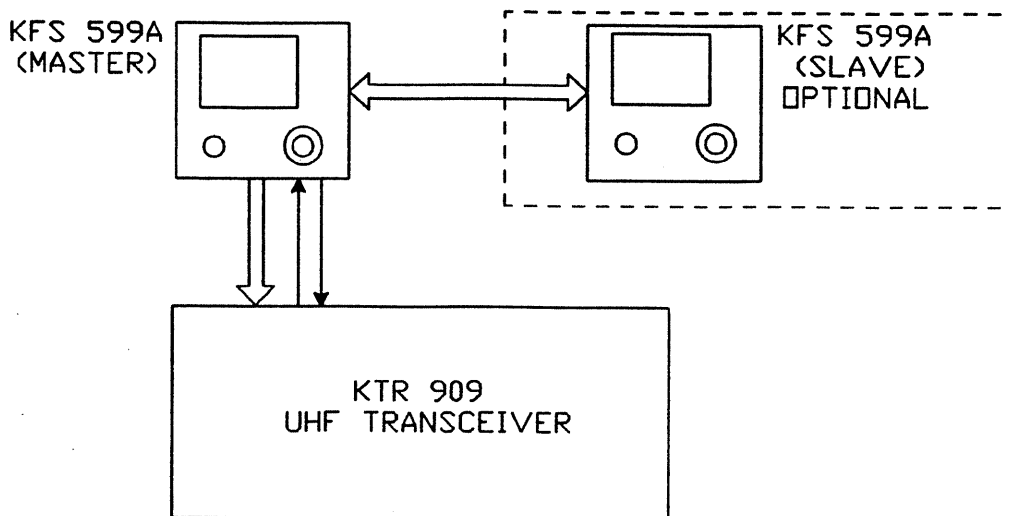


FIGURE 3-1 KTR 909 BLOCK DIAGRAM
(Dwg No GP-AGAA368, R-0)

3.1.2 KTR 909A UHF TRANSCEIVER

The KTR 909A UHF Transceiver is a light-weight UHF communications radio capable of receiving or transmitting voice or data within the frequency range of 225.000 MHz to 399.975 MHz in 25 kHz steps. Tuning information is supplied by a compatible Radio Management System (RMS) using an ARINC 429 interface or a KFS 599A Control Unit as a backup. Refer to Figure 3-2 for a block diagram.

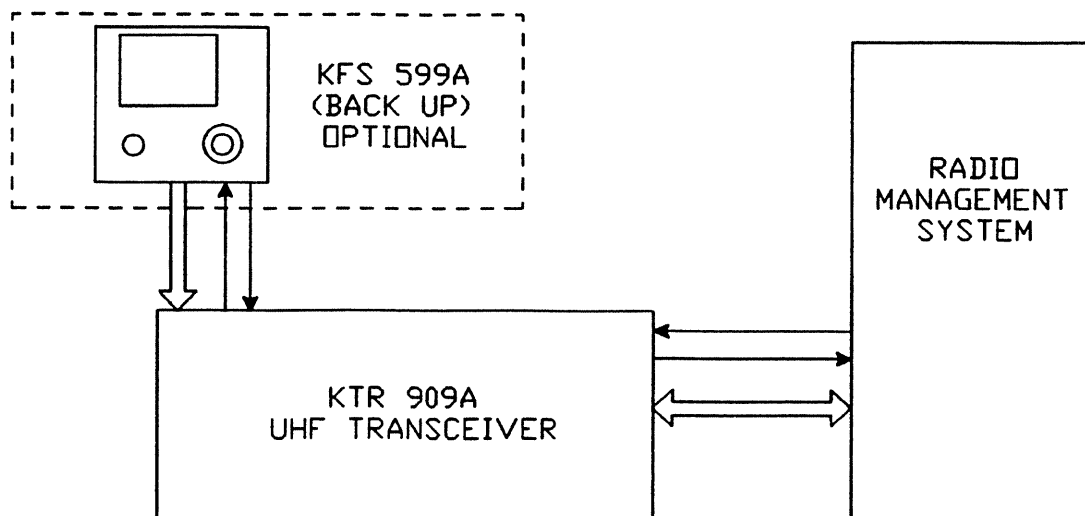


FIGURE 3-2 KTR 909A BLOCK DIAGRAM
(Dwg No GP-AGAA369, R-0)

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UHF COMMUNICATIONS TRANSCEIVER

3.1.3 KFS 599A CONTROL UNIT

The KFS 599A provides channel, frequency, and mode selection. The KFS 599A may be programmed with up to twenty (20) preset channels plus a guard channel.

3.2 CONTROLS AND DISPLAYS

This section describes operating controls and displays for the KFS 599A Control Unit. Refer to Figure 3-3 while reading this section.

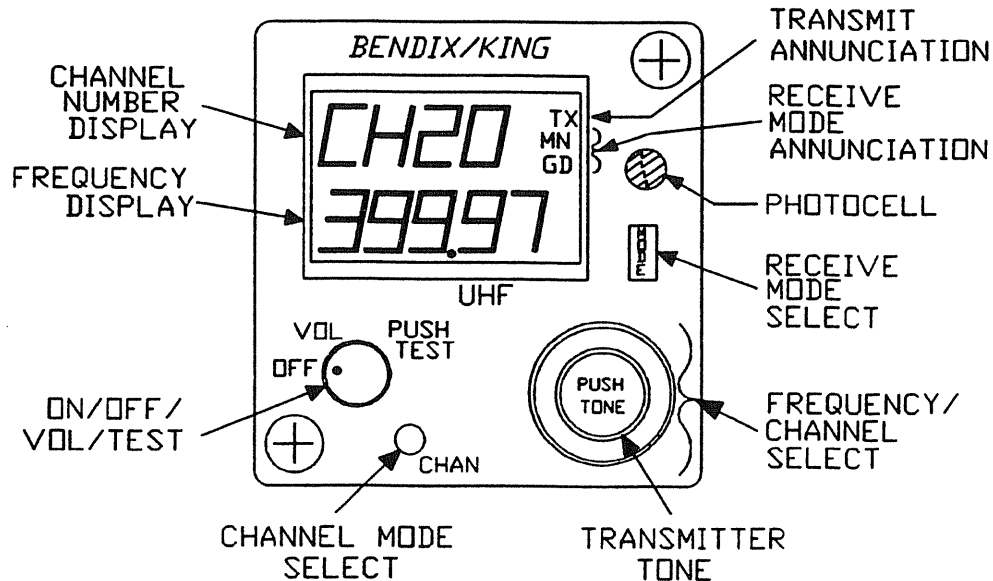


FIGURE 3-3 KFS 599A CONTROLS AND DISPLAYS
(Dwg No GP-AGAA370, R-0)

3.2.1 KFS 599A CONTROLS

3.2.1.1 ON/OFF/VOL/TEST Knob

This knob turns the unit on and off, controls the volume level, and, when momentarily pressed, alternately disables and enables the squelch.

3.2.1.2 CHAN Button

This button, when momentarily pressed, switches the unit between the manual and preset frequency selection modes. When this button is pressed and held, the programming mode is activated.

3.2.1.3 FREQUENCY/CHANNEL SELECT Knob

While in the Preset/Guard Channel Mode, either the inner or the outer knob may be used to change the channel number displayed. While in the manual frequency mode, the outer knob controls the three digits to the left of the decimal point (1 MHz steps) while the inner knob controls the two digits to the right of the decimal point (25 kHz steps). Clockwise rotations increase the displayed number while counter-clockwise rotations decrease the displayed number.

3.2.1.4 PUSH TONE Button

Press and hold this button to activate the 1 kHz tone transmitter test.

3.2.1.5 MODE Button

Each momentary press of the MODE Button cycles through the available receiver modes. These are as follows:

MAIN - Allows transmitting and receiving on the selected frequency.

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UHF COMMUNICATIONS TRANSCEIVER

BOTH - Scans the selected main frequency and the guard frequency for a received signal. Both the MN and GD annunciators are illuminated. When a signal is received on one of the two channels, the receiver stops scanning, and the mode and frequency for the active channel are displayed. Scanning resumes when the receiver becomes inactive.

ADF - When the ADF Mode is enabled and active, the MN annunciator is illuminated and the letters AdF appear in either the frequency display (when preset/guard mode is active) or the channel display (when manual frequency mode is active). The transmitter is disabled and a discrete output enables an independent ADF computer.

3.2.2 OPTIONAL CONTROLS

These sections describe functions which may be enabled as installation options. Refer to the aircraft's Flight Manual Supplement for more complete information.

3.2.2.1 Control Disable Select

This switch will disable the front panel controls of the KFS 599A.

3.2.2.2 Remote Channel Request

This line is normally connected to a push button switch that, when pressed, momentarily grounds this line. When the radio system is not operating with a preset/guard channel selected, momentarily grounding this line will put the radio system in the channel mode of operation. Once the radio system is in the channel mode, momentarily grounding this line will cause the next higher programmed channel to be selected for operation.

3.2.2.3 Program Disable

This switch disables the channel programming feature of the KFS 599A.

3.2.2.4 ADF Enable

This switch enables the ADF function of the KFS 599A.

3.2.2.5 Semi Duplex Inhibit

This switch disables the use of the semi-duplex feature. All channels will have identical receive and transmit frequencies.

3.2.2.6 Remote Guard Select

Normally a push-button switch, when momentarily pressed, activates the guard channel. Pressing this switch a second time will return the KFS 599A to the previous channel.

3.2.3 DISPLAYS

3.2.3.1 Channel Number Display

The top display line contains the channel number while in the Preset/Guard Mode. While in the manual mode, this display line is blank.

3.2.3.2 Frequency Display

The bottom display line contains the active frequency while in either the Preset/Guard Mode or the Manual Mode. When the farthest right digit displays 2, the selected frequency is XXX.X25 MHz. When the farthest right digit displays 5, the selected frequency is XXX.X50 MHz. When the farthest right digit displays the digit 7, the selected frequency is XXX.X75 MHz. Finally, the the farthest right digit displays the digit 0, the selected frequency is XXX.X00 MHz.

3.2.3.3 TX Annunciator

The transmit annunciator (TX) is illuminated whenever the transmitter is active.

3.2.3.4 MN Annunciator

The main annunciator (MN) is illuminated while in either the Main or the Both mode of operation.

3.2.3.5 GD Annunciator

The guard annunciator (GD) is illuminated while in the Both Mode or whenever the guard frequency is active.

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3.3 OPERATING PROCEDURES

This chapter describes the operating procedures for the KFS 599A Control Unit. The procedures covered are as follows:

- Power and Volume Control
- Squelch Test Function
- Receiver Mode Selection
- Preset or Guard Channel Programming
- Preset or Guard Channel Selection
- Manual Frequency Selection
- Transmission

3.3.1 POWER AND VOLUME CONTROL

Note: Some flavors of the KFS 599A do not have volume control. With these flavors, the volume of the received signal is controlled by the aircraft audio/radio control system.

To energize the system, turn the ON/OFF/VOL/TEST knob clockwise out of the OFF detent position. This grounds the ON LINE and energizes the KTR 909/909A which then supplies the operating voltages for the KFS 599A. The unit may be turned off at any time by rotating the ON/OFF/VOL/TEST knob counter-clockwise into the OFF detent position.

Received audio volume is controlled by rotating the ON/OFF/VOL/TEST knob clockwise to increase the volume and counter-clockwise to decrease the volume.

3.3.2 SQUELCH TEST FUNCTION

When the unit is turned on, audio is momentarily unsquelched. After a short period of time, the unit begins operating with automatic squelch. The squelch override function is intended for a radio system check and also to receive extremely weak signals. To override automatic squelch, perform the following steps:

- Press and release the MODE button until the unit is in the MAIN mode of operation (indicated by the MN annunciator being illuminated).
- Press and release the ON/OFF/VOL/TEST knob to remove automatic squelch.

To place the radio back in automatic squelch, momentarily press the ON/OFF/VOL/TEST knob.

3.3.3 RECEIVER MODE SELECTION

One of three receiver modes may be selected using the Receive Mode Select (MODE) button on the KFS 599A. The modes are MAIN, BOTH, and ADF (refer to Section 3.2.1.5). To select the desired Receiver Mode, momentarily press the MODE button until the desired mode is selected.

3.3.4 PRESET OR GUARD CHANNEL PROGRAMMING

This mode allows programming any one of the 20 preset operating channels or the Guard channel. To activate the programming mode, press and hold the CHAN button until the top display line contains the either letter "P" followed by the channel number, or "GdP" for the Guard channel (about two seconds). Use the selector knobs to change the number.

To enter the desired frequency, perform the following steps:

- Momentarily press the MODE button until the frequency display begins to flash.
- Rotate the knobs to select the desired receive/transmit frequency, refer to the Section 3.3.6.

The display now indicates the desired receive/transmit frequency. Different transmit and receive frequencies (Semi-Duplex) may be programmed into every channel except the Guard channel. If the semi-duplex operation is not desired, then the procedure is complete. If semi-duplex operation is desired, then perform the following steps:

- Momentarily press the PUSH TONE button to designate the displayed frequency as the transmit frequency.
- Rotate the selector knobs to enter the desired receive frequency.

Note: If Semi-Duplex Inhibit (P5992, pin 5) is grounded, any programmed semi-duplex frequencies will not be utilized.

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To program another channel, momentarily press the MODE button until the top display line is flashing. Then rotate the knobs to select the desired channel number.

To exit the program mode, momentarily press the CHAN button or wait twenty (20) seconds.

3.3.5 PRESET OR GUARD CHANNEL SELECTION

The CHAN button is used to toggle the radio between manual and preset channel selection. To select a preset or guard frequency:

- Momentarily press the CHAN button until the channel number display (top line) displays either "CH" followed by a number, or "Gd".
- Rotate either knob to cycle through the available channels. Only programmed channels will be displayed. The Guard channel is located between the highest and lowest numbered programmed frequencies.

3.3.6 MANUAL FREQUENCY SELECTION

The CHAN button is used to toggle the radio between manual and preset channel selection. When a frequency is selected manually, semi-duplex operation is not available. To enter a frequency manually:

- Momentarily press the CHAN button until the channel number display (top line) goes blank.
- Rotate the small knob to change the frequency in 25 kHz steps. Clockwise rotations increase while counter-clockwise rotations decrease the displayed frequency.
- Rotate the large knob to change the frequency in 1 MHz steps. Clockwise rotations increase while counter-clockwise rotations decrease the displayed frequency.

3.3.7 TRANSMISSION

For normal voice communications, the transmitter is keyed by pressing the microphone PTT button or the transmitter is keyed through the aircraft radio/audio control system.

3.4 FAULTS AND TESTS

3.4.1 TRANSMIT TIMEOUT

If the transmitter is active for more than 90 seconds, a transmit timeout error occurs. This is indicated by the flashing of every illuminated segment of the display. The transmitter will go inactive until the fault is found or an interruption in the DC power supply occurs. Most cases, this is caused by the microphone PTT button being stuck or a transmission in excess of 90 seconds.

3.4.2 1 kHz TONE

Pressing this button modulates the signal with a 1 kHz tone. This verifies the operation of the transmitter and the audio system. This feature is disabled in the BOTH mode of operation.

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APPENDIX E
ENVIRONMENTAL QUALIFICATION FORM

BENDIX/KING®
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UHF COMMUNICATIONS TRANSCEIVER

**RTCA DO-160C
ENVIRONMENTAL QUALIFICATION FORM**

NOMENCLATURE	KTR 909/909A UHF COMM TRANSCEIVER	
TYPE/MODEL/PART NO.	064-01065-0100 064-01066-0101	
MANUFACTURER'S SPECIFICATION	004-00920-0000	
MANUFACTURER	KING RADIO CORPORATION	
ADDRESS	400 NORTH ROGERS ROAD, OLATHE, KANSAS, 66062-1212	

CONDITIONS	SECTION/ PARAGRAPH #	DESCRIPTION OF CONDUCTED TESTS
TEMPERATURE AND ALTITUDE LOW TEMPERATURE HIGH TEMPERATURE IN FLIGHT LOSS OF COOLING ALTITUDE DECOMPRESSION OVERPRESSURE	4.0 Rev.1 4.5.1 4.5.3 4.5.4 4.6.1 4.6.2 4.6.3	EQUIPMENT TO BE TESTED TO CATEGORIES A2 & D2 CATEGORY X, NO TEST REQUIRED
TEMPERATURE VARIATION	5.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
HUMIDITY	6.0	EQUIPMENT TO BE TESTED TO CATEGORY A
SHOCK OPERATIONAL CRASH SAFETY	7.0 7.2 7.3	EQUIPMENT TO BE TESTED PER DO-160C, PAR.7.2.1
VIBRATION	8.0	EQUIPMENT TO BE TESTED WITHOUT SHOCK MOUNTS TO CATEGORIES B, M, AND N
EXPLOSION	9.0 9.9.3.1	EQUIPMENT TO BE TESTED TO CATEGORY E
WATERPROOFNESS	10.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
FLUIDS SUSCEPTIBILITY	11.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
SAND AND DUST	12.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED

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CONDITIONS	SECTION/ PARAGRAPH #	DESCRIPTION OF CONDUCTED TESTS
FUNGUS	13.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
SALT SPRAY	14.0	EQUIPMENT TO BE TESTED TO CATEGORY S
MAGNETIC EFFECT	15.0	EQUIPMENT TO BE TESTED IS CLASS Z
POWER INPUT	16.0	EQUIPMENT TO BE TESTED TO CATEGORY B
VOLTAGE SPIKE CONDUCTED	17.0	EQUIPMENT TO BE TESTED TO CATEGORY A
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	EQUIPMENT TO BE TESTED TO CATEGORY B
INDUCED SIGNAL SUSCEPTIBILITY	19.0	EQUIPMENT TO BE TESTED TO CATEGORY A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	EQUIPMENT TO BE TESTED TO CATEGORY V
EMISSION OF RADIO ENERGY	21.0	EQUIPMENT TO BE TESTED TO CATEGORY A
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	EQUIPMENT TO BE TESTED TO CATEGORY A
LIGHTNING DIRECT EFFECTS	23.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
ICING TEST	24.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
OTHER TESTS		
REMARKS:		

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**RTCA DO-160C
ENVIRONMENTAL QUALIFICATION FORM**

NOMENCLATURE	KFS 599A UHF COMM CONTROL UNIT	
TYPE/MODEL/PART NO.	071-01546-XXXX 071-01539-XXXX	
MANUFACTURER'S SPECIFICATION	004-00919-0000	
MANUFACTURER	KING RADIO CORPORATION	
ADDRESS	400 NORTH ROGERS ROAD, OLATHE, KANSAS, 66062-1212	

CONDITIONS	SECTION/ PARAGRAPH #	DESCRIPTION OF CONDUCTED TESTS
TEMPERATURE AND ALTITUDE	4.0 Rev.1	EQUIPMENT TO BE TESTED TO CATEGORIES A1 & D1
LOW TEMPERATURE	4.5.1	CATEGORY X, NO TEST REQUIRED
HIGH TEMPERATURE	4.5.3	
IN FLIGHT LOSS OF COOLING	4.5.4	
ALTITUDE	4.6.1	
DECOMPRESSION	4.6.2	
OVERPRESSURE	4.6.3	
TEMPERATURE VARIATION	5.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
HUMIDITY	6.0	EQUIPMENT TO BE TESTED TO CATEGORY A
SHOCK OPERATIONAL CRASH SAFETY	7.0 7.2 7.3	EQUIPMENT TO BE TESTED PER DO-160C, PAR.7.2.1
VIBRATION	8.0	EQUIPMENT TO BE TESTED WITHOUT SHOCK MOUNTS TO CATEGORIES K, P, AND S
EXPLOSION	9.0 9.9.3.1	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
WATERPROOFNESS	10.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
FLUIDS SUSCEPTIBILITY	11.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
SAND AND DUST	12.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED

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CONDITIONS	SECTION/ PARAGRAPH #	DESCRIPTION OF CONDUCTED TESTS
FUNGUS	13.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
SALT SPRAY	14.0	EQUIPMENT TO BE TESTED TO CATEGORY S
MAGNETIC EFFECT	15.0	EQUIPMENT TO BE TESTED IS CLASS Z
POWER INPUT	16.0	EQUIPMENT TO BE TESTED TO CATEGORY B
VOLTAGE SPIKE CONDUCTED	17.0	EQUIPMENT TO BE TESTED TO CATEGORY A
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	EQUIPMENT TO BE TESTED TO CATEGORY B
INDUCED SIGNAL SUSCEPTIBILITY	19.0	EQUIPMENT TO BE TESTED TO CATEGORY A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	EQUIPMENT TO BE TESTED TO CATEGORY V
EMISSION OF RADIO ENERGY	21.0	EQUIPMENT TO BE TESTED TO CATEGORY A
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	EQUIPMENT TO BE TESTED TO CATEGORY A
LIGHTNING DIRECT EFFECTS	23.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
ICING TEST	24.0	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST REQUIRED
OTHER TESTS		
REMARKS:		

